

Brownlowia *tersa* (L.) Kosterm. (Tiliaceae) in India

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Abstract

*Brownlowia *tersa** (L.) Kosterm. not reported beyond Mahanadhi delta, is reported for the first time from Godavari estuary. It is not known from the west coast. Though once abundant, it is now rare in Andamans. The species is described, illustrated and its distribution in India is discussed. It is considered as endangered due to habitat loss.

Keywords: *Brownlowia *tersa**, Godavari estuary, Distribution

Introduction

Roxburgh (1820) established the genus *Brownlowia* (*nom. cons.*) with a species, *B. elata*. He observed that the seeds were devoid of albumen, filled with large embryo and thick fleshy cotyledons. All other genera of Tiliaceae exhibited copious albumen and leafy cotyledons. Bentham (1861) described two more species – *B. peltata* and *B. lanceolata* [= *B. *tersa** (L.) Kosterm.], the latter distributed in India and Malaysia. The genus is now represented by c. 30 species and distributed in Southeast Asia through Malaysia and the East Pacific Islands.

This species was referred to as *Brownlowia lanceolata* Benth. in *Flora of British India* (Masters, 1874) and the regional floras (Prain, 1903; Haines, 1921). Kostermans (1959a,b) in his monograph on *Heritiera* published a combination *Brownlowia *tersa** (L.) Kosterm. based on *Glabraria *tersa** L. (*Glabraria* L. 1771, *nom. rej.* vs *Brownlowia* Roxb. 1820, *nom. cons.*). Linnaeus (1771) cited a reference to the description and a plate of Rumphius (1743) (*Herb. Amboin.* 3: 71, t. 44) in addition to his own description on p. 156 for the genus *Glabraria* and on pp. 276-277 for the species *Glabraria *tersa**. Kostermans (1959) contended that the description given by Linnaeus was a composite one involving two materials – one, a specimen in Linnaean Herbarium and the other, a plate and description of Rumphius. He further added that there was no specimen named by Linnaeus as *Glabraria *tersa** in the Linnaean Herbarium; but there was one sheet (938/1) named so by Smith, which agreed largely with the description and must be the primary basis of *Glabraria *tersa**.

(obvious lectotype); but on p. 156, Linnaeus (1771) included the fruit and seed features from Rumphius (1743), which were clearly of a different taxon. The Rumphian illustration having the status of a syntype and the description, hence had to be excluded from citation. Dandy on the request of Kostermans as cited by the latter (1959a,b), examined and confirmed the identification of the specimen of Linnaean Herbarium as *Brownlowia lanceolata*, which enabled Kostermans to reduce it as a synonym of *B. *tersa**.

The species was not reported from this region in spite of dedicated works conducted earlier (Gamble, 1915-1936; Venkanna & Reddy, 1986; Venkanna, 1987; Pullaiah & Chenniah, 1997; Rao *et al.*, 1999; Ramasubramanian *et al.*, 2003). The plant was not known from the West Coast (Banerjee *et al.*, 2002; Anupama & Sivadasan, 2004). In the East Coast, it is known only from Sundarbans southwards up to Mahanadi delta and never beyond it. Saxena and Brahmam (1994) reported it as common in tidal forests of Jambu, Cuttack and Bhitarakarnika. It was said to be growing abundantly forming dense thickets near large creeks of Middle Andamans and Dhanikhari creek (Parkinson, 1923). Almost c. 80 years later, Debnath (1999) reported it as rarely distributed along creeks in tidal forests in Andamans. There are no recent collections in PBL. It is not known whether its populations have considerably depleted or have been eliminated. The species was designated as endangered, and the habitat loss was the identified threat (Rao *et al.*, 1999).

The distribution of *B. tresa* is so far believed to be restricted up to Mahanadi delta in the East Coast of India. The authors report here its occurrence from Godavari estuary for the first time, beyond Mahanadi delta.

Brownlowia tresa (L.) Kosterm., Penerbitan Madj. Pengetahuan Indonesia 1: 73. 1959 & Reinwardtia 4: 536. 1959; L.K. Banerjee *et al.*, Mangroves Manual 97. 1989; L.K. Banerjee & T.A. Rao, Mangroves Orissa Coast 44. 1990; P. Daniel & Chandrab. in B.D. Sharma & Sanjappa, Fl. India 3: 480, f. 133. 1993; H.O. Saxena

& Brahmam, Fl. Orissa 1: 191. 1994; R.N. Banerjee, Fl. W. Bengal 334. 1997; Debnath in Hajra *et al.*, Fl. Andaman-Nicobar 177. 1999; L.K. Banerjee & T.A. Rao, Fl. Mahanadi 104. 2001; N.P. Singh *et al.*, Fl. Bihar 77. 2001; L.K. Banerjee *et al.*, Divers. Commun. Coastal Pl. India 179. 2002. *Glabraria tresa* L., Mant. Alt. 276. 1771, p.p. (excl. syntype & descr. fruit & seed). *Heritiera attenuata* Wallich Cat. 1140. 1829, nom. nud.; Wight & Arn., Prodr. Fl. Ind. Orient. 63. 1834; Steud., Nomencl. Bot. ed. 2, 1: 750. 1840; Benn. & R. Br., Pl. Jav. Rar. 237. 1844; Walp., Repert. Bot. Syst. 5: 106.

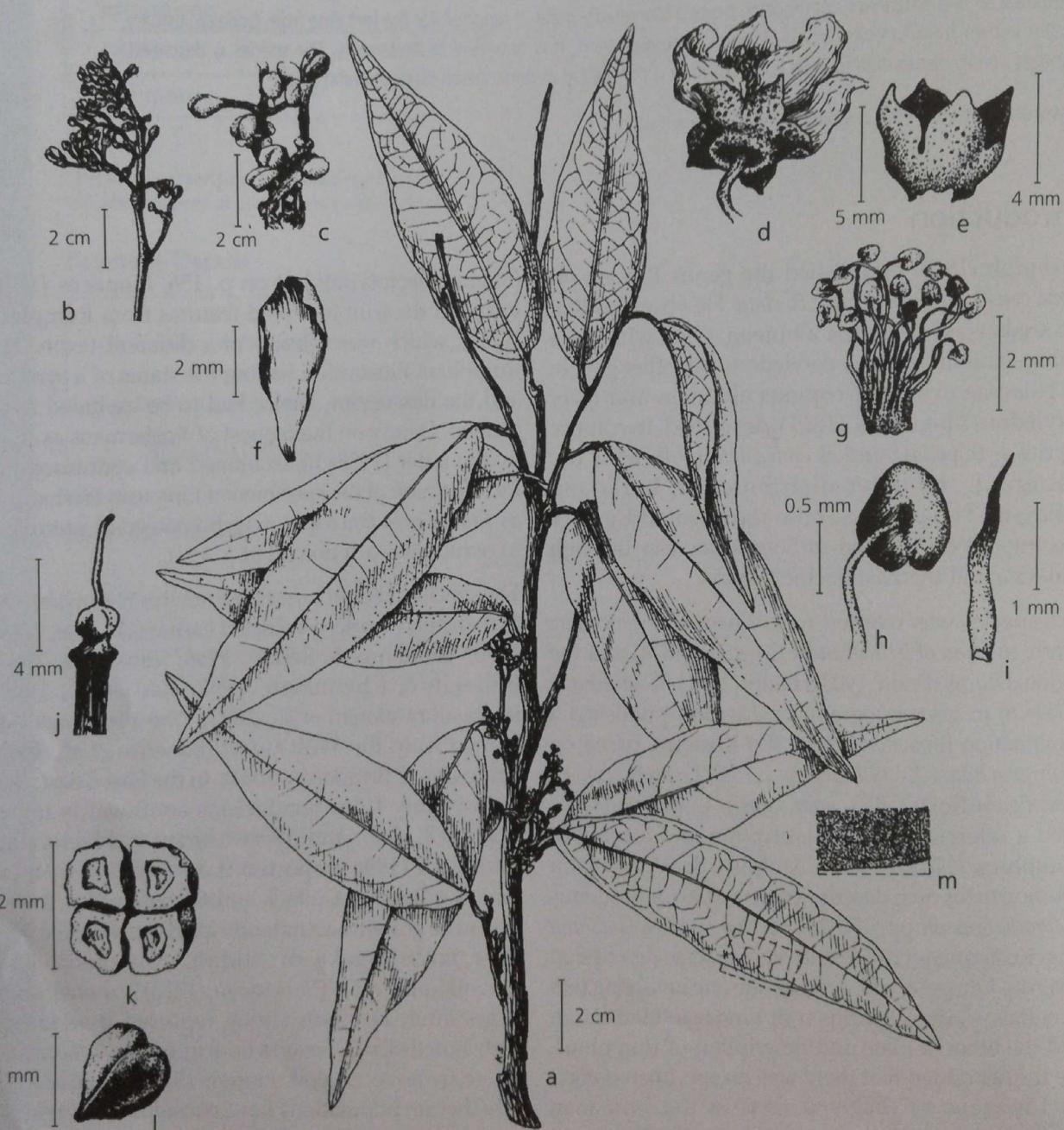


Figure 1. *Brownlowia tresa* (L.) Kosterm. - a. Habit; b. Inflorescence; c. Fruits; d. Flower; e. Calyx; f. Petal; g. Stamens; h. Single stamen; i. Staminode; j. Pistil; k. Ovary (c.s.); l. Fruit; m. A portion of leaf enlarged.



Figure 2. *Brownlowia tersa* (L.) Kosterm. - a. Habitat; b. Inflorescence; c. Flower; d. Fruits

1845; Kurz, J. Asiat. Soc. Bengal Pt.2, Nat. Hist. 42(2): 62. 1873. *Vitmannia polyandra* Steud., Nomencl. Bot. ed. 2, 1: 778. 1840. *Brownlowia lanceolata* Benth., J. Linn. Soc., Bot. Suppl. 2, 5: 57. 1861; Mast. in Hook.f., Fl. Brit. India 1: 381. 1874; Kurz, For. Fl. Brit. Burma 1: 154. 1877; Prain, Bengal Pl. 1: 281. 1903; Haines, Bot. Bihar Orissa 1(2): 87. 1921; C.E. Parkinson, Forest Fl. Andaman Isl. 105. 1923; A.B. Chaudhuri & K. Chakrab., Sundarbans Mangrove 27. 1989.

Figs 1, 2

Shrubs, c. 1.5 m high; branchlets faintly and longitudinally wrinkled, greyish brown in older parts, ferruginous brown towards apex; lepidotes irregularly orbicular, erose at margin, 0.1-0.2 mm across, yellowish brown at periphery and strong reddish brown at centre; internodes 0.5-3.5 cm long. *Leaves* simple, alternate, exstipulate, lanceolate, 4.2-22.3 x 1.2-7.3 cm, rounded or subcordate at base, entire along margin, acuminate at apex, subcoriaceous, glabrous, shiny and dark green above, densely silvery lepidote and dull drying green or pale glaucous beneath; midrib very shallowly grooved and impressed above, raised, longitudinally wrinkled and with brown lepidotes beneath, apparently 3-nerved at base and pinnately nerved above; lateral nerves to 15 pairs with more or less distinct intermediate nerves, obscure above, distinct and

finely reticulate beneath, looping near margin; petioles stout, 5-8 mm long, shallowly grooved when young, recurved or not when old, with lepidotes. *Panicles* terminal, c. 3 cm long with 3 or 4 flowered cymes or axillary, 6-8-flowered subracemose clusters, shorter than leaves; flower buds ovoid, acute at apex, 2-2.5 mm long, yellowish brown with reddish brown lepidotes; pedicels 1.5-7 mm long, 4-angled, longitudinally grooved, lepidoted; flowers bisexual, 6-8 mm long, cream or flesh-coloured; calyx campanulate, 4.5-5.2 mm long, broader and folded inward at base in fully matured flowers, irregularly 3 or 4(-5) lobed, yellowish brown, with brown lepidotes outside; lobes triangular-ovate, acute at apex, c. 2 x 1.5-1.8 mm, finely nerved within; petals 5, rarely 6, obovate, obtuse and faintly emarginate at apex, narrowed and shortly clawed at base, 6-7 x 3-4 mm, cucullate, dull cream or flesh-coloured, finely nerved; claw 0.6-0.8 mm long; stamens c. 70, in 5-8 bundles, unequal in length, bright yellow; filaments united at base, 1.5-4 mm long; anthers 1-loculed, 0.4-0.5 mm long, yellow, longitudinally dehiscing; staminodes 5, linear-lanceolate, often with rudimentary anthers, 1-3 x 0.25-0.35 mm, opposite to petals, nerved at tip; ovary with 3 or 4(-5) clearly free (but adnate to each other) carpels, subglobose, c. 1 x 1.4 mm, dull silvery lepidoted, pubescent; gynophore

short, 0.3-0.4 mm; ovules 2 in each locule; style erect, c. 5 mm long, grooved; stigma entire or faintly 3 or 4 lobed. Drupes pyriform, truncate, 2-lobed at apex, c. 12 mm in across, woody, brownish, 1-seeded; seeds obovoid, without albumen; cotyledons obovate, fleshy.

Flowering & Fruiting: July-October.

Habitat: On banks of creeks, sometimes gregarious in dense thickets, almost half submerged during high tides; in association with *Avicennia officinalis* L., *Clerodendrum inerme* (L.) Gaertn. and *Excoecaria agallocha* L.

Distribution: India (Andaman & Nicobar Islands, Andhra Pradesh; East Godavari District, Orissa and West Bengal), Malaysia and Myanmar.

Local names: *Bola sundari*, *Kedar sundari* (Bengali); *Nata sundari*, *Pani sundari* (Oriya); *Adivi mavidi* (Telugu).

Uses: A good fuel wood (Banerjee, 1997); fruits medicinal (Banerjee *et al.*, 1989).

Specimens Examined: INDIA, Without precise locality, 1871, R. Wight s.n. **Andhra Pradesh**, East Godavari district, Gadapanda, 3.8.2005, P. Venu 119520 (in flower); Gadapanda, 30.9.2005, T. Satyananda Murthy 119568 (in fruit) (MH).

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Literature Cited

Anupama, C. & M. Sivadasan 2004. Mangroves of Kerala, India. *Rheeda* 14: 9-46.

Banerjee, L.K., Rao, T.A., Sastry, A.R.K. & D. Gosh 2002. *Diversity of Coastal Plant Communities in India*. ENVIS – EMCB – Botanical Survey of India, Kolkata.

Banerjee, L.K., Sastry, A.R.K. & M.P. Nayar 1989. *Mangroves in India – Identification Manual*. Botanical Survey of India, Calcutta.

Banerjee, R.N. 1997. Tiliaceae. In: *Flora of West Bengal*. Botanical Survey of India, Calcutta. 1: 334.

Bentham, G. 1861. Tiliaceae. *J. Linn. Soc., Bot. Suppl.* 2, 5: 56-57.

Debnath, H.S. 1999. Tiliaceae. In: Hajra, P.K., Rao, P.S.N. & V. Mudgal (Eds), *Flora of Andaman-Nicobar Islands*. Botanical Survey of India, Calcutta. 1: 175-182.

Gamble, J.S. 1915-1936. *Flora of the Presidency of Madras*. Adlard & Sons, London.

Haines, H. H. 1921. *The Botany of Bihar and Orissa*. L. Reeve & Co., London. 1: 84.

Kostermans, A.J.G.H. 1959a. A Monograph of the Genus *Heritiera* Dry. (Stereuliaceae) (including *Argyrodendron* F.v.M. and *Tarrietia* Bl.). *Penerbitan Madjelis ilmu Pengetahuan Indonesia* (Council for Sciences of Indonesia) 1: 73.

Kostermans, A.J.G.H. 1959b. A Monograph of the Genus *Heritiera* Aiton (Stereul.) (including *Argyrodendron* F.v.M. and *Tarrietia* Bl.). *Reinwardtia* 4: 465-583.

Linnaeus, C. 1771. *Mantissa Plantarum Altera*. Stockholm. 7: 276-277.

Masters, M.T. 1874. Tiliaceae. In: Hooker, J.D., *The Flora of British India*. L. Reeve & Co., London. 1: 379-409.

Parkinson, C.E. 1923. *Forest Flora of Andaman Islands*. Superintendent, Government Central Press, Simla.

Prain, D. 1903. *Bengal Plants*. West Newman & Co., Calcutta. 1: 281.

Pullaiah, T. & E. Chennaiah 1997. Tiliaceae. In: *Flora of Andhra Pradesh (India)*. Scientific Publishers, Jodhpur. 1: 145-158.

Ramasubramanian, R., Ravishankar, T. & D. Sridhar 2003. *Mangroves of Andhra Pradesh – Identification and Conservation Manual*. MSSRF, Chennai.

Rao, R.S., Sudhakar, S. & P. Venkanna 1999. *Flora of East Godavari District, Andhra Pradesh, India*. INTACH, Hyderabad.

Rao, T.A., Molur, S. & S. Walker (Eds) 1999. *Indian Mangrove Ecosystem*. *Zoo's Print* 14: 1-33.

Roxburgh, W. 1820. *Plants of the Coast of Coromandel*. W. Bulmer & Co., London.

Rumphius, G.E. 1743. *Glabraria. Herbarium Amboinense*. Amsterdam. 3: 71, t. 44.

Saxena, H.O. & M. Brahmam 1994. Tiliaceae. In: *The Flora of Orissa*. Orissa Forest Development Corporation Ltd., Bhubaneswar. 1: 190-194.

Venkanna, P. 1987. *The Flora of the Krishna District*. Ph.D. Thesis, Andhra University, Visakhapatnam.

Venkanna, P. & T. Appi Reddy 1986. *Flora of West Godavary District, Andhra Pradesh, India*. Indian Botanical Society, Meerut.

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